Boston

New England Agricultural Society.

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ADDRESS BY

HON. GEORGE B. LORING,

AND REPORT OF

COL. DANIEL NEEDHAM,

THE SOCIETY'S COMMISSIONER TO MEXICO.

FEBRUARY 3, 1891.

LOWELL, MASS.:
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HON. GEO. B. LORING'S ADDRESS.

TUBERCULOSIS.

Gentlemen of the Society : — It is an important part of our duty to investigate the questions upon which the value of agriculture as an occupation depends. In no calling is more candid and dispassionate inquiry necessary, whether in relation to our crops or to the animal economy of the farm. And I have always been inclined to call your attention to any absorbing subject, either of cultivation or of health or disease, which has occupied the public mind. We have witnessed the rise and fall of many agricultural problems which have presented themselves to the community as of vital importance to the industry which we represent. Many of these problems have been solved by time and experience, and have vanished before the good sense of practical farmers. Some have proved to be valuable, and some are still under investigation.

The most important matter to which the attention of the community is now called is the existence, the contagiousness, and the extirpation of tuberculosis. This disease has long been known in the human family; and it has been accurately described from the earliest days of careful hygienic investigation, and its existence has been attributed to injudicious breeding when found in animals, to bad hygienic conditions, to direct infection, to unhealthy locality, and to any debilitating causes. In the human subject it has long been known that a crowded and ill-ventilated apartment, a damp and marshy locality, scarcity of good, nutritious food, a depressing mode of life, would often bring about a scrofulous condition in the form of miliary tubercles, destined to destroy the texture of the parts in which they accumulate, and to end in consumption. Among the causes of tuberculosis breeding has been included. In animals this may be a cause, i. e.: certain delicate breeds of animals, or certain delicate families of any one breed, may be peculiarly liable to this disease when exposed to the causes I have enumerated. In the

human family the disease occurs in persons so differently constituted that it is hardly safe to include breeding as a prominent cause. We have seen men of great constitutional vigor, with strong frames, full chests, vigorous physique, cut down, while the slender and delicate have escaped. We have seen the parents succumb in early or middle life, and the progeny live on in good health and to a good old age. The human constitution, as inherited, is governed by so many subtle and undefined causes that, fortunately for the affections of the race, man can defy the animal laws which would appear to control a judicious breeding of animals. We can therefore, with perfect propriety, select vigorous, well-developed animals for the continuance of the species; but we cannot control the affections of the human heart, and "forbid the banns" on account of what seems to us physical incongruity. Let us confine ourselves, therefore, to the animals which are provided for food and labor, and are subjected to diverse and discordant influences.

Tuberculosis in animals is evidently a self-generated disease. Its existence depends on locality, food, and the condition of the stable in which the animals are confined. It is not universal. All observers agree that it is found mostly in the older sections of the country —in the eastern states, and in those regions in which cattle are confined for dairy purposes. It prevails among the confined and well-fed cows in states when there is no disease whatsoever among the common and commonly-fed cattle of the country. It has not been found among working-oxen so far as we know. In Eastern Virginia, where cows are fed for the milk they will yield, it prevails, and it is so entirely confined to cows of this description, cows which are kept in stables and are fed on concentrated food, that the farmers of that section understand that cows subjected to this dairy treatment are liable to have their lungs and digestive organs loaded with miliary tubercles. The milk-producing breeds, such as Guernseys and Jerseys, with their delicate constitutions, are very apt to be tuberculous; while the lighter milkers, the Herefords and Devons, are rarely diseased. The facts now indicate that the abandonment of milk-farms would remove the disease.

I do not care to discuss the pathology of the disease; I leave that to scientific experts, and to the application of the microscope. To the veterinary surgeons who, for the last few years, have pursued

their investigations with great diligence and care we owe the accepted theory of infection, which has been confirmed by the skill and ingenuity of Koch. They have ranged themselves along-side of the most illustrious of that great scientific corps who have revealed the secrets of the human organism, and have explored the mechanism of the animal structure. To them it appears that tuberculous bacilli cannot multiply outside of the animal structure, but can be introduced into the bodies of various animals, and are productive of the tuberculous disease, constituting the exciting cause. The infection of these bacilli occurs when a definite predisposition exists, growing out of a cold followed by consumption or attending a scrofulous diathesis. It is supposed that the bacilli pass into the deep structures of the body and into the blood from the superficial tissues where they have made a lodgment, and are thence borne by the circulation into various parts of the body — the lungs, the mesenteric glands, the articulations. Consumption follows the inhalation of the bacilli, which accumulate in particles of dust in rooms where the sputa of phthisis have accumulated, and, retaining their vitality for a long time, gather in small colonies or large, and produce a slow or rapid disintegration of the parts. It is said that "at least twenty-five per cent. of adult human deaths are due to this disease, and at least fifty per cent. of us have it and then recover;" this is the opinion of one of the most eminent of our veterinary surgeons.

Tuberculosis can be propagated in various ways. It can be conveyed to the lungs by the inhalation of bacilli which are floating in the air of rooms in which consumptive patients have been confined, and whose sputa are converted into dust. A severe cold on the lungs furnishes a nidus for the fungi in large numbers or small, and they do their work slowly or rapidly according to the surrounding circumstances. Tuberculous patients can impart the disease to cattle as well as persons by filling the air with the dusty particles. And animals can affect human beings in a similar manner — on this point authorities differ. The bacilli can be conveyed to the human subject, as they say, by the use of meat or milk from tuberculous animals. It is found that a cow diseased with tuberculosis can give bacilli in the milk, and also in butter and cheese; and out of thirty-six cows ten were found to have bacilli in the milk and cream. This

milk has been fed to calves for a period of six months, and care has been taken that the calves were from healthy mothers. Pigs have been fed with the surplus milk. Twenty-five calves and twelve pigs have been killed, and forty per cent. of each have been found tuberculous; "the post-mortem examination showing very few morbid changes, perhaps two or three little nodules, no larger than a very big grape-seed, in the liver," which under the microscope "possessed the usual appearance of tubercles;" and bacillus was found, "*showing that the disease* was present, and would in most cases extend."

Rabbits and guinea-pigs have been inoculated with milk or cream containing bacilli and have died in the course of a few weeks; and "in a few instances these little animals had tuberculosis after having been inoculated when no bacilli were found in the milk." The danger from the use of tuberculous meat has not been studied as has that from milk, but it is undoubtedly true that the heat applied in cooking is sufficient to destroy the germs. Infection by inoculation may be accidental or intentional, and results in a nodule at the point of entrance — as is the case in the introduction of any morbid matter.

The diagnosis of tuberculosis in animals is very difficult, either in its early stages or later. We accept the following advice from an accomplished veterinarian, Dr. Peters, who spoke not long ago in this hall, on this subject: —

"In examining a cow, then, besides examining the lungs and noticing whether there is a persistent cough, note also whether the external lymphatics are enlarged and hard, observe whether she is free from lameness, find out whether she is constipated, and at other times affected with diarrhœa, learn if possible whether she is a nymphomaniac, commonly called a butter, ascertain if abortion is a frequent occurrence in the herd, and examine the udder, and see if it is nodulated or if it is what is commonly called gargety."

The remedies for tuberculosis, recommended by veterinary surgeons, are, in short: —

1. Protect the animals against consumptive keepers; and be sure that consumptive keepers do not conceal their disease.
2. Collect the sputum in pieces of woolen cloth or in little boxes which can be burned after use; or in spittoons wet with carbolic acid.
3. Destroy the diseased meat, and sterilize the milk.

4. Isolate all suspected animals.
5. Slaughter all actually infected animals.
6. Use no infected animal in breeding.

I may add: feed well, keep the stable clean and well ventilated, protect against cold, remove all depressing influences.

How far these six remedies are practicable I leave you to judge; the view I have given thus far has the sanction of present veterinary authority.

I now submit the views on tuberculosis presented in 1889 at a meeting of the Academy of Medicine in Paris by the most learned of this scientific body — views which I submitted to the Board of Agriculture in this state at the time. The debate arose on a report on tuberculosis, during which M. Lancereaux said: —

"I agree with the Commission of the Congress of Tuberculosis in a large part of the opinions it has given. Meanwhile, I believe it is too much controlled by experiment, and not by clinics. I believe that contagion plays a secondary part in the pathology of tuberculosis; that this disease is due to many causes, among which are the density of population and dwellings and living in confined air, both of which play the principal part. Among predisposing causes, which are of equally great importance in the spreading of consumption, alcoholism should be placed in the front rank. These considerations lead me to believe that various elements contribute to the development and extension of tuberculosis, and that contagion is not one of these elements. I should advise, therefore, a modification of the conclusion of the commission.

"Two factors causing the disease and controlling the creation of tuberculosis are: *predisposition in the organic structure and the introduction into that structure of a special parasitic agent.*

"The sputa, above all, when they are dry are a great cause of contagion. The same may be true with regard to the milk of an animal whose *udder is diseased*, and also in some cases the meat of an animal having tuberculosis."

"There is one point," said M. Villemin, "on which nearly all of us are agreed, and that is the danger from the expectoration of consumptives. We agree also on the proper prophylactic measures. For a long time experiment has shown the virulent activity of the sputa of persons afflicted with pulmonary tuberculosis. The discovery of

the bacilli of tuberculosis has only confirmed the opinion I then advanced.

"I agree with M. Lee in rejecting the idea that the air breathed is susceptible of contamination. He will agree with me in what I have said upon the immunity of physicians and servants in the rooms and hospitals of tuberculous patients is true. It follows that if we speak of atmospheric infection it is from the dust of expectorated matter, and not from the presence of tuberculous virus in the air.

"I come now," says M. Villemin, "to the transmission of tuberculosis by alimentary causes. This sort of contagion is less frequent than that caused by expectorated matter. Milk may be poisonous, it is true, when it is furnished by a cow affected with mammary tuberculosis. It may happen when a diseased cow in licking herself shall have impregnated her teats with her contagious discharge.

"Personally, I am inclined to accept the opinion of M. Lee with regard to pneumonia and bronchitis. But if the commission has considered inflammations of the bronchial tubes and lungs as favorable to the implanting of tuberculous bacilli in those organs they have based their opinions on the assertions of Koch alone, and *not on facts*."

It is evident that M. Villemin does not agree with some of our veterinarians that a "little ulcer" in the lungs caused by a cold will furnish a bed for the bacilli. Nor do the French academicians agree with some of our own scientists.

The inhalation of the dust of dried tuberculous sputa and the introduction of the bacilli into the skin are two recognized means of imparting the disease. Beyond this we have not progressed far. Of twenty-five calves and twelve pigs which had been fed on the milk of diseased cows "about forty per cent. were found to be tuberculous. They were, most of them, in good health to all external appearance, and the post-mortem examination showed very few morbid changes;" "under the microscope the nodules possessed the usual appearance of nodules." The rabbits and guinea-pigs were inoculated, we learn from an observer.

While authorities differ with regard to the danger and the transmission of tuberculosis, and while the results of examinations are not very positive, we are warned against "the ravages of a most destruct-

ive malady among the human race, and against a dangerous and destructive infectious disease among our animals." It is said that consumption is largely on the increase throughout the country — in fact, throughout the world — on account of the prevalence of the bacilli. Let us see.

The population of England and Wales in 1881 was 25,974,439; in 1889, 29,015,613; the number of deaths from consumption in 1865 was 58,724; in 1889, 44,738, being a reduction of 13,986. This reduction ought to be considered.

In the United States the number of deaths by consumption in 1880 was 91,270 — 40,512 males, 50,758 females. The death-rates from consumption are in each 1,000,000 deaths: males, 242,-842, females, 302,046; for colored, males, 248,179, females, 326,-973; for those of Irish parentage, males, 309,507, females, 375,636; and for those of German parentage, males, 249,498, females, 254,-948. From these figures it would seem that the proportion of deaths from this cause in the colored race is but slightly greater than in the white, and that it is greatest of all in the Irish. The disease prevails most in New England and the Middle States, the Middle Atlantic Coast, the Ohio Valley, the western part of Kentucky, the central part of Tennessee, and on the coast of California. The proportion of deaths is greater in the interior of Michigan and Ohio than on the lake coast, and on the gulf coast of Texas than in the interior of that state. The regions showing the least proportion of deaths are in southern and western Georgia, central Alabama, Arkansas, Kansas, and the western territories. The Appalachian region also shows a low proportion as compared with the country lying on either side. It seems that the existence of the disease in the United States is controlled by locality and climate. As we have no returns prior to 1880, and the census of 1890 will not be completed under a year, we can make no comparisons for this country.

In Massachusetts, however, the record has been kept since 1880, and the comparisons are most interesting. The percentage of deaths by consumption of the total mortality was, in 1880, 15.56, and in 1889, 13.35, a marked diminution. The number of deaths from consumption registered in 1888 was 5,581, of which number 2,666 were of males and 2,915 females. The actual number of deaths from this cause was 147 less than that of 1888, 290 less than 1887,

and 316 less than that of 1886 The large number of deaths from consumption, numbering 5,581, nearly equal to the number of deaths from all other causes, demands an accurate and comparative investigation into such mortality. In the five western counties, Worcester, Berkshire, Franklin, Hampden, and Hampshire, the number of deaths in 1889 was 1,240: in Essex, Suffolk, Middlesex, and Norfolk, 3,600; in Barnstable, Bristol, Dukes, Nantucket, and Plymouth, 741. We have been told that while 10 to 25 per cent. of the milch cows in Eastern Massachusetts are tuberculous, the disease is much more rare in the western part of the state; and yet the proportion of consumption to the population is greater in the western counties than in the eastern. The amount of milk consumed in 1880 was valued at a little more than $5,000,000; the amount consumed in 1889 was 72,528,628 gallons, valued at $10,312,762. The disease does not increase in proportion to the milk consumed; on the contrary, the more milk, apparently the less consumption.

It seems that the bacilli of tuberculosis are a vegetable growth, a fungus of most minute proportions, found not only in diseased but in apparently healthy tissues. They have been found, on post-mortem examinations, in healthy organs which have not been exposed to the influence of disease; and also in diseased organs, where they find a nidus for their accumulation and destruction. Dr. Nuttall of Johns Hopkins University informs me he has found 3,000,000,000 in a consumptive's autopsy; and he also states that they collect in the lymphatic glands along the bronchi and lie dormant indefinitely. When tuberculous disease in any form is superinduced by a marshy locality, or bad food, or by scanty clothing, or an unhealthy climate, or an enfeebled constitution, then the bacilli accumulate in great numbers, and destroy the vitality of the parts in the animal economy as larger fungi destroy the plants and crops of the field. Undoubtedly the remedy consists in the removal of the cause, whether that cause is found in the influences of nature or in the habits of life. The use of a specific to arrest the progress of tuberculosis in its incipient stages promises great artificial aid to sanitary processes; and pure air and good food, joined with Dr. Koch's lymph, may go far to remove the disease which has been and is so destructive to the generations of men.

In the Report of the Consulting Committee of Public Hygiene in

France I find some important statements. M. Gerlach and M. Toussaint succeeded in conveying tuberculosis unquestionably to animals which had been inoculated. Gerlach's experiments repeated by Johne did not succeed. In the Congress of Copenhagen M. Cheauveau declared that he had been unsuccessful in inoculating tuberculosis. In the same congress M. Valin, a most careful and intelligent investigator, declared that he had failed to impart tuberculosis to twelve guinea-pigs which had been inoculated with the juice of a tuberculous guinea-pig. Every one of the twelve escaped. The experiments of M. Nocard seem to be equally unsuccessful, his trial having been on fifteen guinea-pigs, inoculated with juice from a tuberculous cow. All escaped. Multiplied researches in the opinion of the Board of Health rendered the problem of infection more difficult.

Now a word with regard to the danger of beef as an article of food. In the muscle of the animal the tuberculous germs, when they exist, are not abundant. If, indeed, you inject the virus directly into the blood it seems that it does not remain long in the muscles. The statement of M. Nocard proves this. He injected the tuberculous germ, not under the skin, nor into the peritoneum, nor into the digestive organs, but into the blood, and fifteen hours afterwards he could not succeed in imparting tuberculosis by using the juice of the muscle; while the juice of the viscera continued to furnish positive results. Considering this fact, M. Cheauveau, who had also discovered it, has declared that tuberculosis does not attack the muscles, and that "fillets of beef come always from superior animals, whose health can be considered excellent." In the present state of scientific investigation the use of beef may be considered perfectly safe and innocuous. Beef can be eaten with impunity, according to the most skilful of French scientists.

The question of milk is as yet undecided — so I learn from some of the most skilful and diligent of our scientific observers. The possibility of infection by bacilli through the alimentary canal is yet to be considered. In making this inquiry the power of the digestive juices in destroying infectious germs, as a germicide, should be taken into the account, there being no doubt that this power exists. Experiments carefully made show this to be the case. A quantity of solid or liquid food taken into the stomach is submitted to a process

of digestion which reduces the most obstinate substances to a uniform consistency, in order that they may pass into the circulation, and there is no evidence whatever that bacilli can resist its influence. The evidence thus far proves that they cannot. In this opinion Dr. Nuttall agrees with me entirely.

The observations of German scientists have supplied us with many interesting facts relating to this fatal disease. In Frankfort in 1889 sixteen per cent. of the cows were tuberculous, thirteen per cent. of the bulls, six per cent. of the oxen, and eight thousandths of one per cent. of the calves.

Stallocek says: "Twenty per cent. of cattle fed with rubbish, i. e., the remains of sugar factories or of breweries, die of tuberculosis; one per cent. of cattle in the pastures."

Finkelnberg says: "In the west and south of Germany, where moorland exists to a large extent, tuberculosis is largely found and is fatal."

He also says, "Phthisis mortality is very small on the sea-coast. In those mountain regions where the natural draining of the water and its outflow are well-regulated, mortality is smaller than in other mountain regions."

Brush thinks the reason of so much tuberculosis in cows is that they are *weakened through milking*. They suffer from the weakness of lactation. Our observations in Virginia are that where the cows are forced by high feeding in their dairy work they have miliary tuberculosis; the ordinarily-fed pasture cows never.

Rubner says: "The air which people infected with tuberculosis exhale has no bacilli; they are thrown up only by coughing up the solid infected matter."

The problem of tuberculosis is still open for exact scientific exploration. We know, however: —

1. That this fungoid growth is found in tuberculous cases of men and animals.

2. That the inoculation of bacilli is fatal to the lower order of animals.

3. That the inhalation of bacilli is fatal to the diseased human system; and to the healthy when introduced in sufficient quantity.

4. That the introduction of bacilli into the system by alimentation is not necessarily attended with fatal consequences.

5. That phthisis decreases in England and the United States.

6. That we do not find phthisis without bacilli; but we do find bacilli without phthisis.

7. That bacilli are sometimes found in apparently healthy bodies.

We do not know:—

1. How many generations of men and animals were affected by bacilli before the microscope revealed them.

2. What relations exist between microscopic fungi and the animal economy in which they are found, and between the fungi of the field and the crops they infest.

3. Whether or not the removal of the well-known causes of consumption would also remove bacilli.

4. That "tuberculosis is principally in those regions where cattle are raised," as is asserted by Brush.

When we remember the dependence of man on the animals of his farm, and the vast amounts invested in them, together with the consequences of extirpation and the difficulty of drawing the limits of diseased districts, we can realize the importance of scientific certainty and caution in arriving at conclusions on this subject to which the farmer is entitled, and which he has a right to expect from his scientific allies and friends.

Mr. Harold C. Ernst, who is employed at Mattapan in the work of investigating tuberculosis, and has been for three years, avails himself of the columns of the *Massachusetts Ploughman* to reply to my address on this subject, which I delivered before the Committee on Agriculture, and before the New England Agricultural Society in February last. I have no desire to obstruct or interfere with any scientific investigation into the causes of disease or the means of preserving health in men or animals; but I am anxious that both sides of a disputed question shall be heard, and that an investigation should be employed in ascertaining the truth, and not in substantiating a theory.

Dr. Ernst objects to my view of tuberculosis, and says:—

1. "No one who had even a slight knowledge of cryptogamic botany or bacteriology would confound the bacillus of tuberculosis with a fungoid growth."

In reply, let me say it is universally recognized that the bacillus of tuberculosis is a fungus, a vegetable growth, a cryptogam, and not an animal structure. It belongs to the lowest orders of fungi, in which are included molds and mildews, and on this account may be called a "fungoid growth." Bacillus is defined as "a microscopic rod-shaped vegetable organism." And fungus ranges from mushrooms to microscopic forms.

2. Dr. Ernst objects to my use of the term "lower order of animals," and says: "The scientific statement would be, that the inoculation of the bacilli may be fatal to animals susceptible to the disease, tuberculosis." I have no doubt of that; but I have found that the guinea-pig is a favorite subject for the inoculation; and I will leave the classification of the guinea-pig to Dr. Ernst, and will confine my own remark to those animals which are "susceptible," including all warm-blooded animals, all of which, according to Koch, are more or less susceptible.

3. Dr. Ernst accepts my view that "the introduction of bacilli into the system by alimentation is not necessarily attended with fatal consequences," and remarks that nobody ever claimed that it was.

In his argument before the committee of the Legislature he remarked, however: "The third method of infection is by eating the germ when contained in food, either meat or milk of animals diseased." And again he says: "Rarely-done roast beef or rare beefsteak from a tuberculous cow would not be safe food to eat." And he cites the statistics of the Jews to prove that "a portion of the tuberculosis of mankind is traceable to the use of tuberculous beef and milk." He adds that, "in reply to a circular letter addressed to over two thousand physicians, between twelve hundred and thirteen hundred answers were received, of which two disbelieved in the danger of using the milk of a tuberculous cow or *woman* as food; a large number said the matter was difficult to prove, while several stated that they had distinctly traced the infection of children to a diseased cow or a diseased wet-nurse." This is hardly science. We ought to know how many tuberculous wet-nurses are employed.

4. In reply to my statement that phthisis decreases in England and the United States, Dr. Ernst suggests that this is no "reason for even suggesting an opposition to further steps in the same direction" of investigation. I have never suggested such opposition;

on the contrary, I replied to a question of the committee that I thought the investigation ought to go on.

5. Dr. Ernst objects to my use of the term "phthisis" in connection with the bacilli in the lungs, and says: "The presence of the bacilli of tuberculosis in the lungs or other organs proves the presence of tuberculosis" — no more. But in his argument before the committee of the Legislature he says: "When this disease is located in the lungs it is commonly called consumption." And he also remarks that "the most frequent method of infection is by breathing into the lungs the dried dust from expectorations of men or animals afflicted with consumption."

Dr. Ernst agrees with me "that bacilli are sometimes found in apparently healthy bodies," but concludes that "the bodies are only apparently healthy," and that the bacilli will produce "the usual pathological changes" if we will only give them time enough. His colleague, Dr. Peters, thinks there are many recoveries in men and animals.

6. When we inquire "what relations exist between microscopic fungi and the animal economy in which they are found, and between the fungi of the field and the crops they infest," we are reminded by Dr. Ernst that "we are not dealing with fungi," but scientific authority says we are.

7. I asked in conclusion "whether the removal of the well-known causes of consumption would also remove bacilli." I am told that "there is but one cause of tuberculosis — the bacilli of that name." But every pathologist knows that phthisis and consumption and tuberculosis are synonymous terms, and all are generally used for the one dread disease, as Dr. Ernst himself uses them. When Koch administers his lymph with hopes of success he gives it to a patient who has a deposit of tubercle at the apex of the left lung, and has incipient consumption. When the "bacilli of tuberculosis" are paraded as a specific disease, one of the phenomena of an old and prevalent disease is placed in the rank of maladies which the immortal Louis investigated, and whose characteristics the modern microscope has only revealed. The causes of consumption to which bacilli seem to flock are, according to M. Lancereaux, whom Dr. Ernst considers no "authority whatever, competent to judge," "density of population and dwellings and living in confined air,"

and "alcoholism," and a bad climate and depressing influences and hereditary taint. And we have the authority of an associate of Dr. Ernst that "a little ulcer" in the lungs, caused by a cold, will furnish a bed for bacilli. When a consumptive patient abandons a cold and damp climate for a warm and genial one he withdraws from the causes of consumption, and if the investigators will insist that he is beset by bacilli and has no consumption he simply invites his fungi to uncongenial influences, and to a climate in which the fungi will not flourish — as he hopes. If he recovers he is cured of consumption, by whatever other name veterinary science may have classified it.

Dr. Prudden in an exhaustive article on bacteria in *Harper's Monthly*, for April, 1891, speaks of "consumption or tuberculosis" as synonymous terms.

GEO. B. LORING.

COL. DANIEL NEEDHAM'S REPORT.

One year ago to-day at the annual meeting of the New England Agricultural Society, held in this hall, you were pleased by a unanimous vote to commend me as your representative to the official rulers of the neighboring Republic of Mexico.

Having made my visit among the people of Mexico, having studied the institutions of the country, and having enjoyed far more than the average opportunity of meeting and conversing with the President of that Republic, and governors of several of the states, and other official personages, it has seemed to me fit that at this first opportunity after my return I should make to you some report embracing the result of my observations and the many privileges afforded me by courtesy of officials and leading citizens of the Mexican Republic.

On Thursday, March 6, 1890, having received through the American Minister, Mr. Ryan, an invitation from President Diaz to meet him at the palace, and to take with me as many of my friends as would be agreeable, I visited the President at four o'clock in the afternoon, this being the hour fixed in the letter of invitation, and took with me sixty ladies and gentlemen, all residents of the United States of America. Minister Ryan volunteered his services to give me a formal introduction.

As President Diaz entered from a rear door in the great audience-chamber, and walked the entire length of the room to reach the assembled visitors, we had a most excellent opportunity to observe his manly features and his firm, elastic movement. A man of about sixty-two years, slightly gray, medium size, and dark complexion. His movement and gestures were very graceful, and his voice clear and musical. As he approached the head of the room, Minister Ryan stepped forward and introduced me as a citizen of the United States, interested in the trade relations of the two republics, and as the accredited representative of the New England Agricultural Society. More than a quarter of a century has passed since it was

my good fortune to represent the Vermont State Agricultural Society and the state of Vermont in a foreign country. But I never felt more proud of a constituency than I did of you, gentlemen of the New England Agricultural Society, when I spoke in your behalf in the palace of the President, in that ancient city of Mexico, now redeemed from the thraldom of kings, emperors, and revolutions, and standing as the capital of a sister republic, on the continent of our own America, reaching out for the things that make for peace, and the purifying of government, and the ennobling and building up of a true, enterprising, and intelligent manhood.

I will read to you from the only daily paper printed in the English language and published in the City of Mexico, *The Two Republics*, the account of my meeting President Diaz, and the addresses connected therewith.

Minister Ryan accompanied the party to the palace and presented Col. Daniel Needham to the President as the spokesman of the excursionists, who numbered more than sixty persons. Col. Needham delivered the following address in English: —

"Mr. President: I have the honor to present to you my friends and associates from the United States of America, who have come to this Republic and this grand and ancient city of Mexico with the view of securing a better understanding and a more satisfactory knowledge than can be obtained by histories and books of travel.

"To say that we are deeply impressed with the grandeur of this ancient city, with its colossal and artistically-wrought statuary, with its magnificent parks, with its broad, regularly-laid-out and cleanly streets, with its stately and dome-crowned cathedrals, its noble palace, and magnificent castle of Chapultepec, and its other public as well as private buildings, doing credit to the architectural skill and taste of your people, is but feebly expressing emotions which language is inadequate to communicate.

"We shall bear to homes in our native land recollections which will enable us to give to citizens and friends graphic accounts of well-conducted industries based upon advancing science, and to tell of an established interest by schools and seminaries of learning in universal education organized under the government and supported and appreciated by the people; as well as of the wonderful site of your ancient city, happily fashioned by nature, and so adorned

by the hand of skill in its construction and artistic arrangement.

"For myself, representative as I am of the New England Agricultural Society, an organization which represents the agricultural, commercial, and industrial wealth of the six most northerly and easterly of the United States of America, including as its great commercial centre the city of Boston, I bring you the good will of our people and an expression of the hope that the most intimate trade relations shall be firmly established, that it may forever appear that on the continent of America we have a common interest — the interest of the people — and that the one and only great Columbus, to whom you have erected a colossal and beautiful monument, belongs in part to us of the United States of America, as well as to you of the United States of Mexico.

"Mr. President, thanking you for the honor of this reception in behalf of the association which I represent, and of my associates here gathered together, and for myself, personally, and with earnest wishes for your continued health and the rapid growth of your prosperous republic, I bring this brief address to a close."

Senor P. de la Sota, one of the official interpreters of the party, translated the above address for the President.

Through the medium of Mr. E. C. Butler, of the American Legation, President Diaz made the following reply: —

"Colonel Needham, I am very much gratified to meet you and the party who accompany you. It is always a pleasure for me to meet distinguished sons and daughters of our sister republic. For a long period Mexico has emulated the United States, that oldest, greatest, most populous and progressive republic of the American continent. We have taken your country for our model honestly and earnestly. Though at times we have not lived up to your bright example in everything, our wish, our desire has been to emulate all that is great and noble in your great and noble country. I am always glad to meet, in this social, friendly way, representative and distinguished and cultured gentlemen and accomplished ladies from the United States, for I believe the best way of cultivating neighborly relations and good feeling is by this interchange of reciprocal intercourse, bringing us closer together, till we become better acquainted; and it is a pleasure to me that the study of Mexico and of her interests, her present and her future possibilities, lies in the

hands of such accomplished ladies and gentlemen as yourselves. The best form of education, I take it, is objective; to see things for ourselves, rather than only read them. Thus your visit to Mexico will, I trust, aid you better in understanding our country, in appreciating our situation, in studying our interests, than any other method of instruction. Let me say right here, please, what I have so often said before to your countrymen who have thus honored me in visiting me, that I hope for closer relations between your people and the people of my country. Mexico wants to see you come here; she welcomes you; she throws open the doors to every honorable enterprise born on your soil, every great movement conceived in your great country. We want you to come without faltering, to place your magnificent industrial resources, your capital, your genius, on our soil, become partners in our enterprises and sharers in our future prosperity.

"In closing allow me to say that it has been a positive pleasure to me to thus have met you and the party you represent. I hope your stay in Mexico will be agreeable and profitable; and that to such a degree that some, if not all, of you may find it to your interest to return here some time."

Having been thus welcomed and received, I was commended to the other officials of the government for such statistics as I might need to aid me in forming an opinion of the growth of the industries of the people and the progress of the various educational and charitable institutions.

The interest everywhere manifested by President Diaz in his people, and the responsive devotion manifested by the people in this great progressive leader of the Republic of Mexico, is constantly apparent. Every morning the President may be seen between ten and eleven o'clock, riding on horseback through the principal streets of the city, dressed in plain citizen's attire and without an attendant, bowing to the multitude on the right and left, as they move through the great thoroughfares or stop with uncovered heads to receive his salutations.

This fearless manifestation of confidence in the people has undoubtedly been a means of securing from the masses obedience to government and inspiring love and respect for the great ruler.

The City of Mexico is laid out in squares, like the city of Phila-

delphia, and in this regular form of skilful civil engineering was it found by Cortez, a hundred years before the Puritans landed on the shores of Massachusetts Bay. The city is built of white marble, and has a population of four hundred thousand. It is located in a plateau, seven thousand five hundred feet above the level of the ocean, fifteen hundred feet higher than the top of Mt. Washington, and yet in its plazas and outlying grounds grow the orange, lemon, and other semi-tropical fruit trees in great luxuriance and abundance.

Says the historian, "With the progress of Aztec culture, Mexico (the city) rapidly improved, and about 1450 the old mud and rush houses were replaced by solid stone structures, erected partly on piles amid the islets of Lake Tezcuco and grouped around the central enclosure of the great Teocalli." The city had reached its highest splendor on the arrival of the Spaniards in 1519, when it comprised from fifty to sixty thousand houses, with perhaps 500,000 inhabitants, and seemed to Cortez, in the language of Prescott, "like a thing of fairy creation rather than the work of mortal hands." It was at that time, as is well established, about twelve miles in circumference, everywhere intersected with canals, and connected with the mainland by six long and solidly-constructed causeways.

Whoever goes to Mexico and visits its capital city, expecting to find anything but grandeur and magnificence, combined with skilful engineering and architecture, and lavish expenditure of money, will be greatly disappointed. For without question it is certainly one of the most cleanly, imposing, and beautiful of American cities.

The area of the Republic of Mexico embraces twenty-seven states, one territory, and the Federal District, which includes the City of Mexico, the capital of the Republic. These several states comprise nearly eight hundred thousand square miles, and contain twelve millions of inhabitants. Among the leading cities of the several states might be mentioned Guadalajara, containing one hundred thousand; Guanajato, seventy thousand; Puebla, seventy thousand; and thirty other prosperous cities, ranging from five to thirty-five thousand people each.

All the European domestic animals are to be found in abundance, and in some of the Mexican states are to be found immense herds of oxen, numbering twenty and even thirty thousand, the property of a single owner. Maize, beans, coffee, tobacco, sugar, and in fact

every variety of agricultural product known to the civilized world, can be found growing in this wonderful country; and the native forests produce rose-wood, mahogany, oak, pine, lignum vitæ, and every other variety of wood used in cabinet and architectural manufacture.

The food and agricultural crops are estimated at two hundred millions of dollars annually, and for purposes of taxation the landed property is appraised at more than three hundred and fifty millions of dollars.

The precious metals constitute a large item in the exports, and these in 1882 amounted to eighteen millions of dollars. The currency is silver and copper, no gold being used in either government or mercantile transactions.

The people are large purchasers of English and American goods, and the fostering care of England has given her manufacturers great advantages in the Mexican markets. Thus far American manufacturers have had but limited opportunity to take advantage of the liberal purchases made by Mexican merchants in foreign lands; but there is no reason why a large portion of the goods now obtained in England should not be supplied by the United States. Minister Ryan is outspoken on this matter, and feels that our government has embarrassed rather than fostered our trade relations with the people of this neighboring republic.

Traversed by five great lines of railroad; its eastern shore washed by the Gulf of Mexico and its western by the Pacific Ocean; almost ready to open one of the most magnificent harbors of the world on its eastern coast, at Tampico, where the navies and merchantmen of the world will find ample protection against the most terrific Northers, which have up to the present time been a terror to sailors frequenting the Mexican coast; with public schools established and maintained in all the states of the Republic; with a government prudent, enterprising, and popular, inviting and securing immense capital from England, the United States, Germany, and France, there can be no doubt but that the days of bloody revolution have made their last pages in its history, and the combined influences of advancing wealth, civilization, and native soil and climate will place this republic second only in its development to our own United States of America.

DANIEL NEEDHAM,

Feb. 3rd, 1891. *Commissioner.*

HISTORICAL APPENDIX.

It has been thought well, in connection with the publication of the address of the Hon. Geo. B. Loring and the report of the Hon. Daniel Needham, commissioner of the society to the City of Mexico, to give a brief history of the New England Agricultural Society and its annual fairs, held in different localities, to the present time.

In January, 1864, a report and resolutions were adopted by the State Board of Agriculture of Massachusetts setting forth the importance of a New England Agricultural Association. A call was therefore issued to the various agricultural societies organized in the different states of New England to send delegates to a convention to be held in Worcester, Mass., on the second day of March, 1864, to organize such an institution. Every New England state responded and there were present at the meeting thus called many of the most active and intelligent promoters of the art of agriculture. The meeting was called to order by the Hon. Geo. B. Loring of Salem, Mass., and the following named gentlemen were elected the first board of officers: —

President. — Geo. B. Loring, Salem, Mass.

Vice-presidents. — Ezekiel Holmes, Winthrop, Me.; Frederick Smyth, Manchester, N. H.; Daniel Kimball, Rutland, Vt.; T. S. Gold, West Cornwall, Conn.; Amasa Sprague, Cranston, R. I.; Wm. H. Prince, Northampton, Mass.

Secretaries. — Charles L. Flint, Boston, Mass.; Henry Clark, Poultney, Vt.

Treasurer. — Thomas Sanders, Brookfield, Vt.

Maine.

Trustees. — Samuel F. Perley, Naples; John F. Anderson, So. Windham; Calvin Chamberlain, Foxcroft; Dr. N. T. True, Bethel; Wm. D. Dana, North Perry.

New Hampshire.

Jos. B. Walker, Concord; Moses Humphrey, Concord; S. W.

Buffum, Winchester: N. Hubbard, Tamworth: Nicholas V. Whitehouse, Rochester.

VERMONT.

Daniel Needham, Queechy; George Campbell, West Westminster; Edwin Hammond, Middlebury; Ebenezer Bridge, Pomfret; A. M. Clark, St. Albans.

MASSACHUSETTS.

C. O. Perkins, Becket; Paoli Lathrop, South Hadley Falls; Leverett Saltonstall, Newton; S. B. Phinney, Barnstable; A. W. Dodge, Hamilton.

RHODE ISLAND.

E. D. Pearce, Providence; David Pike, River Point; A. B. Chadsey, Wickford; J. De Wolf Perry, Bristol; Thomas B. Buffum, Newport.

CONNECTICUT.

J. G. Webb, New Haven: Benj. Sumner, Woodstock; R. Battell, Norfolk; P. M. Auger, Middletown; C. M. Pond, Hartford.

At a meeting of the trustees, subsequently held, it was voted to hold the first fair at Springfield, Mass. In accordance with this decision, the first fair was held at Springfield, Mass., September 6th, 7th, 8th, and 9th, 1864. It was attended by an immense concourse of people, and the exhibition was pronounced by the press as far superior to anything of the kind ever held previously in the country.

Governor John A. Andrew delivered the opening address, his first words being, "I hail this becoming and beneficent gathering of the yeomanry of New England." The address occupied an hour, and was published by the press, not only of New England, but of all the Middle and Western States.

Prof. Agassiz, Dr. Loring, and many other gentlemen, took part in the discussions of the meeting. The weather throughout the fair was clear and beautiful.

The second fair of the society was held at Concord, N. H., September, 1865. Governor Frederick Smyth delivered the address. The weather was cloudless, and the immense crowds that gathered at the exhibition more than met the anticipation of the resident popu-

lation, who had made great preparation for their accommodation.

The third fair was held at Brattleboro', Vermont, September, 1866. Ex-Governor John A. Andrew, of Massachusetts, delivered the address. The weather was beautiful and clear during the four days of the exhibition.

The fourth fair was held at Cranston, R. I., September, 1867. Addresses were delivered by Ex-Governor Andrew, Hon. Salmon P. Chase, Major-General Howard, General A. G. Burnside, and many other gentlemen. The weather was perfect during the four days of the exhibition.

The fifth exhibition was held at New Haven, Conn., September, 1868. At this exhibition the society had the first discomfort from bad weather, the third day of the fair being a heavy rain-storm. Governor English delivered the address.

The sixth exhibition was at Portland, Maine, September, 1869. Addresses by Senator Hamlin, Major Putnam, of Portland, Colonel George F. Shepley, Governor Padelford, Hon. Sidney H. Perham, Ex-Governor Coburn, Dr. Loring, and a large number of other gentlemen. On the evening of the second day there was a terrific storm, which did much damage to the tents and fences. But at an early hour of the third day repairs were fully made, and the weather of the four days was otherwise delightful.

The seventh exhibition was at Manchester, N. H., September, 1870. The address was given by Senator Patterson. The four days of the fair were pleasant.

The eighth exhibition was given at Lowell, Mass., September, 1871. The four days were pleasant. Governor Claflin, Ex-Governor Boutwell, Governor Perham, of Maine, and many other gentlemen addressed the people.

The ninth exhibition was at Lowell, September, 1872. Four days of beautiful weather. At this exhibition on the third day it was computed that no less than sixty thousand people were in attendance.

The tenth exhibition was held at Mystic Park, Medford, September, 1873. Address by Rev. W. H. H. Murray. The third day was rainy, and the fair was continued into Saturday on that account. All the other days of the fair were pleasant.

The eleventh exhibition was held at Narragansett Park, Provi-

dence, September, 1874. Addresses by Governor Howard and Mayor Doyle, of Providence. The weather of the four days was perfect.

The twelfth exhibition was at Manchester, N. H., September, 1875. Address by Henry Ward Beecher. The afternoon of the third day was rainy; all the other days were pleasant, and the fair was continued over Saturday.

The thirteenth exhibition was in connection with the Centennial at Philadelphia, and known as New England at the Centennial, September, 1876. Addresses were given by Colonel Daniel Needham and Hon. S. D. Harris, and poems were read by Mrs. Helen Barron Bostwick and Mrs. Ophelia Forman. The attendance at the Massachusetts Building, where the exercises were held, was very large, and the entire four days given to their meetings were pleasant.

The fourteenth exhibition was at Portland, Maine, September, 1877. The weather of the four days was cloudless. Addresses were made by Governor Connor, General J. Marshall Brown, and other gentlemen.

The fifteenth exhibition was given at Worcester, Mass., September, 1878. Addresses by Governor Rice and Dr. George B. Loring, Mayor C. B. Pratt, Governor Prescott, Hon. W. W. Rice, and Col. Daniel Needham. One of the four days of the fair was rainy.

The sixteenth exhibition was given at Worcester, September, 1879. Addresses by Governor Long, Dr. Loring, Governor Head, Attorney-General Devens, Ex-Governor Boutwell, and Hon. A. W. Beard. The four days of the fair were pleasant.

The seventeenth exhibition was held at Worcester in September, 1880. Gen. Wm. T. Sherman was present, and addressed the people. The school children of Worcester were massed on the main street in front of the Court House, and as the great procession passed it halted while the children sang "Marching through Georgia." The bands and the multitude joined in the chorus. On this occasion there was a military display, in which all the companies of Worcester took part.

The eighteenth exhibition was held at Worcester in September, 1881. The weather was pleasant with the exception of the third day, which constantly threatened rain, and undoubtedly affected the attendance at the fair.

The nineteenth exhibition was at Worcester, September, 1882. The weather was fair; and among the many distinguished guests was Vice-President Wheeler, who delivered a most acceptable address to the people.

The twentieth exhibition was at Manchester, N. H., September, 1883. The weather was fair during the entire four days.

The twenty-first exhibition was at Manchester, N. H., September, 1884. The weather was fair during the entire exhibition.

The twenty-second was at Bangor, Maine, September, 1885. A large number of the leading men of Maine were present and addressed the people from the grand stand. Four days of perfectly fair weather. Hon. James G. Blaine was present.

The twenty-third exhibition was held at Bangor, Maine. September, 1886. On the second and third days, in the morning, there was threatened rain. The afternoon of the third day there was a successful balloon ascension, in addition to addresses by leading public men who honored the occasion.

The twenty-fourth exhibition was held at Worcester, Mass., September, 1887. With the exception of the second day, which was lowery, the weather was beautiful.

The twenty-fifth exhibition was held at Worcester, Mass., September, 1888. The weather was fine during the fair.

The twenty-sixth exhibition was held at Worcester, Mass., September, 1889. The weather was fair. Address by Hon. Daniel Needham.

The twenty-seventh exhibition was held at Worcester, Mass., September, 1890. The mornings of the second and third days threatened rain and undoubtedly affected the general attendance.

At the first annual meeting, in 1864, Geo. B. Loring was elected president, and has continued in office to the present time.

Charles L. Flint and Henry Clark were elected secretaries at the first annual meeting, but resigned after holding the first fair at Springfield in 1864. Daniel Needham was then elected secretary, and has held the office continually up to the present time, 1891.

Thomas Sanders was elected the first treasurer and continued in office one year; he was succeeded by Isaac K. Gage, who continued treasurer five consecutive years, and was followed by the election of Geo. W. Riddle, who has held the office to the present time, 1891.

Summary of the receipts of the New England fairs from twenty exhibitions from the seventh to the twenty-seventh, inclusive, taken from the books of Geo. W. Riddle, treasurer:

	Receipts.	Profits.	Loss.
7th Annual Fair held at Manchester, 1870	$27,560.00	$2554.07	.....
8th " " " " Lowell, 1871	25,743.00	5600.00	.....
9th " " " " Lowell, 1872	31,250.00	6061.44	.....
10th " " " " Mystic Park, 1873	24,014.00	.....	$2,915.20
11th " " " " Providence, R. I., 1874	22,365.00	973.74	.....
12th " " " " Manchester, 1875	20,360.00	1200.00	.....
13th " " " " Centennial, Phil., 1876	.....	.....	.....
14th " " " " Portland, Me., 1877	20,000.00	.....	.....
15th " " " " Worcester, 1878	19,556.59	2653.27	.....
16th " " " " Worcester, 1879	21,701.99	4476.54	.....
17th " " " " Worcester, 1880	23,090.00	3771.84	.....
18th " " " " Worcester, 1881	20,647.89	1640.97	.....
19th " " " " Worcester, 1882	21,954.09	3069.93	.....
20th " " " " Manchester, 1883	15,887.58	896.67	.....
21st " " " " Manchester, 1884	12,864.73	.....	686.85
22d " " " " Bangor, 1885	27,178.79	2223.36	.....
23d " " " " Bangor, 1886	23,751.00	.....	.....
24th " " " " Worcester, 1887	22,076.00	.....	.....
25th " " " " Worcester, 1888	23,667.52	2141.43	.....
26th " " " " Worcester, 1889	24,271 58	2231.65	.....
27th " " " " Worcester, 1890	21,725.62	2100.00	.....
TOTALS	$449,655.38	$41,594.91	$3,602.05

RECAPITULATION.

Fifteen fairs, profit . . .	$41,594.91
Three fairs, no profit	
Two fairs, loss	$3,602.05

NOTE. — No financial record of the six exhibitions held prior to the year 1870 is at hand.

The eighth and ninth exhibitions, held at Lowell in 1871 and 1872, the admission fee was only 35 cents. At all other fairs the admission has been 50 cents.

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For the Year 1891.

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